

# **EXHIBIT "B"**

**ENGINEER'S SUPPLEMENTAL REPORT**

of the

**McKEAN RESIDENCE FIRE**

Prepared by:

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November 29, 2013

## **McKEAN RESIDENCE FIRE**

### **ENGINEER'S SUPPLEMENTAL REPORT**

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#### **A. INTRODUCTION**

On September 22, 2011, a fire occurred at the residence of Stephen and Michele McKean located at 803 Raymondskill Road, Milford, Pennsylvania.

On February 5, 2013 I completed a report stating my findings from my investigation. Since then additional materials have been received. This supplemental report includes the review of the additional materials available.

My investigation was performed to determine whether a ceiling fan/light above the living room could be ruled out as a cause of the fire.

I may use the following materials as exhibits to illustrate testimony: exemplar ceiling fans, exemplar ceiling fan parts, evidence from this fire, and all documents referenced in this report and in my February 5, 2013 report.

Robson Forensic invoices the work associated with this investigation at a current rate of \$355.00 per hour. My total billing charges for hours worked to date are estimated at \$33,000. I have included a CV outlining my qualifications and a listing of my testimonies within the last 4 years with this report.

#### **B. ADDITIONAL MATERIALS AVAILABLE FOR REVIEW**

1. Deposition transcript of Russel Andress taken July 17, 2013
2. Pennsylvania State Police Incident Report dated October 7, 2011
3. Written statement of Stephen McKean
4. Deposition transcript of Stephen McKean taken October 24, 2013
5. Deposition transcript of Michele McKean taken October 24, 2013
6. Miscellaneous documents
7. Miscellaneous photographs
8. 911 Call audio recording.
9. Report of Joseph Myers, CFI, CFEI, CFII dated April 18, 2012

### **C. BACKGROUND**

Certified Fire Investigator Thomas Jones investigated the cause of the fire. In his October 10, 2011 report he stated, "In conclusion based upon a reasonable degree of fire investigative certainty it is my opinion that this fire was Arson and incendiary in nature. There are 5 distinct and separate points of origin. There is no communication between the 5 points of origin found." He also stated, "On the middle couch the ceiling light/fan had fallen. The fan was examined and there is no sign of any malfunction or unusual electrical activity."

The McKean residence has an open layout with no walls to separate the kitchen, dining, and living areas. The locations of the origins identified by Mr. Jones are all within this open area. Following the fire, soot and fire debris were found in many remote areas of the 2 story house. Mr. Jones confirmed this in his report where he states, "There are heavy carbon deposits in the entire home indicating a slower type of smoldering fire."

The ceiling fan/light was found on the sofa below where it had hung prior to the fire. There were significant parts of the ceiling fan/light that had not been examined prior to the December 10, 2012 inspection.

### **D. DEPOSITION TRANSCRIPT OF RUSSEL ANDRESS TAKEN JULY 17, 2013**

1. He was contacted about the fire sometime after 8:00 PM on the night of the fire. Page 13
2. He arrived at the site of the fire at 10:30 PM on the night of the fire. Page 13
3. He was called by the Milford Fire Chief Tony Mann who was requesting an origin and cause investigation of the fire. Pages 18 - 19
4. On his way to the fire he was already aware that the fire chief thought there were suspicious circumstances. Page 19
5. Mr. McKean called to report the fire at 7:14 PM. Page 20
6. Extinguishing the fire was pretty easy for the fire department. The fire had suffocated itself. Page 20
7. The fire department was dispatched at 7:18 PM and arrived at 7:25 PM. Page 21
8. He was at the scene of the fire for about an hour and a half. Page 24
9. He concluded the fire was of incendiary origin approximately 40 minutes after he arrived. Page 25
10. He determined there were five different points of origin. Page 29

11. "...The kitchen island had a stack of bills, documents, lying flat on the surface. The documents were burned. The top document was burned and the ends curled in. Next to it, I believe, was a magazine and next to that was a wicker holder that had envelopes and bills inside of it and other documents with no fire around. Nothing else burned. Paper – the same type of paper higher in elevation than these documents lying flat on a hard surface. That fire was incendiary in nature. An open flame was placed on an edge or in contact with combustible paper and left to burn." Page 30
12. "The second fire was a linen-type cloth against the interior wall between the kitchen and the front doorway. It was on the kitchen side of the doorway lying on the floor against the baseboard." Page 33
13. The third fire was the love seat. The fourth fire was the couch. The fifth fire was the leather covered stuffed chair. Pages 36 – 38
14. 80 percent of the couch was impinged by fire. "...the majority of the fire damage, if I'm facing the couch – if I'm standing in front of the couch facing the couch, the majority of the damage would be on the center, the right center, with lessening degrees of damage as you move to the left where the interior wall and the bathroom accessway would be. In that gap between the wall and the couch was some type of a wooden – whether it was a coat rack item or item of that type and a lamp and an electrically-charged type of picture or photograph on that interior wall." Pages 38 – 39
15. "I believe a human being used an open flame igniting combustible materials on the couch. Whether it was the couch material itself, I'm not sure. There was not enough left of it to make that determination." Page 39
16. The leather chair fire "was started by a human being with an open-flame device holding it to the base of the leg rest at the front of the chair causing the chair to catch fire and burn across its seat." Page 41
17. He has not determined what time the fire started or how long it burned. Pages 44 – 45
18. It is his opinion that at some point in time between 4:30 in the afternoon and 7:14 at night some human being used a match or a lighter and lit the top of four pieces of paper on the kitchen counter, went to the linen on the floor and used a match or a lighter and lit the linen on the floor, went to each of the three pieces of furniture and used a match or a lighter to light those three pieces of furniture. The order may have been different. Page 46
19. He found no indication of an ignitable liquid being used to either start the fire or make it grow bigger. Page 49
20. He ruled out that the fire was of electrical origin. He examined the electrical appliances and branch circuits. Pages 49 – 50

21. The circuit breaker for the fan had tripped. "If operating correctly, yes, that should have tripped because the ceiling fan is in the main room of fire, the living room, on the ceiling. It is electrically charged to the box, the plastic box, that is mounting it. Fire is in – all the very hot gases that fire produces are at that ceiling layer causing damage to the ceiling fan itself, the electrical box that houses it, and the wiring causing wiring to lose its insulation which makes metal-to-metal contact which will, in fact, cause that breaker to activate when it's operating properly. The electrical system was very well installed in this house." Page 51
22. He didn't take the fan apart. He examined the parts of the fan that were exposed. Pages 52 – 53
23. There was drop down. It was "later in the fire." Page 56
24. He concluded that there was no flash over. Page 56
25. He didn't determine whether the fan or any lights were on at the time of the fire. Pages 56 – 57
26. The windows were all closed. Page 57
27. He took a blue Bic candle-style lighter from the scene. He didn't take anything else. Page 57
28. Mr. McKean is a suspect with respect to a potential arson charge. Page 64
29. He met Mr. McKean in 1999 when the original home on the property was destroyed by fire. Page 66
30. Mr. McKean had a fire in the living room of his home somewhere in 2010. Page 68
31. He reviewed 4 hours of Walmart security because, "Mr. McKean had stated he had gone to Walmart to pick up groceries." Page 74
32. The Rite Aid signature report indicates that Mr. McKean picked up medication the day after the fire. Page 75
33. His interview of Mr. McKean was just after the fire while he was sitting in his vehicle at Mr. McKean's residence. Page 75
34. At the time of the fire the home was "pending foreclosure". Page 78
35. "What we see happening in this fire, given the construction of this structure, a vaulted ceiling in the center of the structure, as these individual items are burning, all those super-heated gases and unburned fuels are rising into the ceiling layer, which is covered

in drywall, and traveling to the upper reaches of the structure. We have no open windows. We have no ventilation sources until this fire self-ventilates through a front window adjacent to the living room. We have very little, if any, fire movement from each of these fires.” Page 84

36. “A fan is not a good fuel load. Where the electrical components are located in the fan – within the motor and the branch wiring feeding that fan, there is very little fuel. We have a vinyl plastic insulation on wires. The fins or blades on a fan likely would be combustible. Other than that, it’s not a high fuel volume component.” Page 85
37. There was no evidence of breaking or entering. Page 89
38. He suspected that the fire in 1999 was an incendiary origin. Page 100
39. “...the fire in this case was oxygen starved because the house was sealed up tight. Great construction. Well-built. Quality materials. Lots of drywall. Unfortunately, the couches – you know, thank God for modern technology and they are not made with terribly-combustible materials anymore. They burned. They burned in place. They caused some adjoining damage. Drywall kept the fire from spreading throughout the rest of the structure and it consumed the majority of the oxygen causing a smoldering type of fire rather than a blazing open-flame fire. It burned for a while.” Pages 103 – 104

#### **E. PENNSYLVANIA STATE POLICE INCIDENT REPORT DATED OCTOBER 7, 2011**

1. The report is by Tpr Russel Andress. Page 1
2. “This officer...observed heavy smoke, and soot deposits throughout the main portion of the living room, and kitchen. These deposits are visible on all horizontal surfaces, and on the vertical surfaces to near floor level. This officer traveled via an interior stairway to the second floor of the residence, and observed heavy soot deposits, and smoke damage, but no direct flame damage.” Page 3
3. “This officer returned to the main level of the residence, and examined the kitchen area. This officer observed heavy soot and smoke damage throughout this area, and two specific areas of localized fire damage. The first area of damage occurred on the floor next to the interior wall which separates the kitchen from the living room. This officer observed a charred rag or towel lying on the hardwood floor. Examination of this charred towel reveals heavy charring of the wood molding at the base of the wall, and charring to the floor surrounding this towel. This officer examined the area to determine how this towel could have ignited, and found no fire extension from the living room, and nothing in the area which could have accidentally caused this towel to combust. This officer next examined a small pile of charred paper on the kitchen counter. This charred paper is surrounded by other undamaged papers, and the fire damage is restricted to this small stack of what appear to be bills. This officer examined the counter area to determine if there was something on the counter capable of starting a fire to these papers, and found

nothing. This officer examined the area to determine if radiant heat or convection could have resulted in ignition of these papers, and found that other papers at a higher level on the countertop are undamaged. After careful consideration this officer determined that both the papers on the counter and the rag on the floor are separate and distinct points of origin, and both fires are incendiary in nature.” Page 3

4. “Examination of the couch reveals heavy sustained fire damage to the floor directly beneath the couch, which is consistent with damage normally found beneath stuffed furnishings. This officer examined the area surrounding the couch for potential ignition sources, and found several electrically powered devices at either end of the couch. Examination of the exposed power cords for these devices revealed no indications of arc damage, and no indications of internal heating. Examination of the standard dual outlets at the left end of the couch reveal no indications of malfunction. Examination of debris revealed no other evidence of competent ignition sources. Examination of the lamp power cable at the right end of the couch revealed no indications of arc damage or malfunction, and examination of the lamp itself revealed that the bulbs were intact, and the lamp itself only suffered moderate damage. Examination of fire patterns and analysis of fire damage revealed a slow burning fire on the couch which consumed the leather bound surface synthetic padding, and wood framing. This fire produced some radiant heat which damaged adjacent combustible items, however the open construction of the room, and high ceiling prevented full room involvement. After careful examination and analysis of all evidence this officer determined that the fire on the couch was incendiary in nature, and is the result of the use of an open flame to ignite the combustible components of the couch surface.” Page 4
5. “This officer continued examination of this room, and examined the love seat at the center of the living room. This furnishing is similar in design to the couch, and exhibits the same fire damage to the combustible surface, padding, and wood framing components. Fire damage to the floor surrounding the love seat is more severe than that of the couch, and results in a burn through of the hard wood flooring, and the sub-floor. Radiant heat damage is limited to the combustible items in close proximity to the love seat, and no extension of fire damage is observed. This officer examined the area of the love seat for competent ignition sources, and found a metal framed glass top end table identical to the table found at the right end of the couch. This table contained a lamp which is heavily damaged by fire, however examination revealed no indications of arc damage to the power supply cable, and no indications of malfunction with the lamp itself. This officer located the heavily damaged remains of a ceiling fan/light fixture which was mounted at the center of the room. Examination of the fan/light reveals no indications of malfunction, and it is eliminated as a potential ignition source. This officer observed a stuffed recliner located to the right of the metal end table. This recliner suffered some radiant heat damage to the side closest to the love seat, however sustained combustion from this radiant heat did not occur. After careful examination and analysis of all evidence this officer determined that the fire on the love seat is incendiary in nature and is the result of the use of an open flame to ignite the combustible components of the couch surface. This point of origin is a separate fire and not a result of fire extension from the couch or any other area.” Page 4



6. "This officer continued examination of this room, and examined the recliner which is to the right of the love seat, this recliner suffers two distinct areas of fire damage, which are unconnected. The left arm of the recliner suffers radiant heat damage which destroyed the leather covering on the arm, and left side, with no extension from that area. This damage was caused by the fire on the love seat. The reclined seat suffers heavier fire damage which destroys the leather covering, and penetrates the padding exposing the metal springs in one section. This fire appears to have self extinguished. Examination of the fire patterns on the recliner reveal a clear V shaped pattern which begins on the lower front cushion, and extends upward and out from that area. The base of this V pattern is the exact point of origin for this fire, and an examination of possible ignition sources reveals nothing which could have started a fire at this point except for direct open flame application. During the examination of the recliner this officer discovered a partially melted candle style butane lighter. This lighter was lying on the seat cushion against the back rest. This lighter was photographed in place, and was secured as evidence. After careful examination and evaluation of all evidence this officer determined that the fire on the recliner is incendiary in nature, and is the result of open flame application to the combustible recliner covering. This fire is separate and distinct, and is not the result of fire movement from the couch or the recliner." Page 5
7. "After careful evaluation of all evidence at this scene this officer determined that there are five separate and distinct fires within this residence. Each of these points of fire origin were carefully examined and were found to be incendiary in nature." Page 5

#### **F. WRITTEN STATEMENT OF STEPHEN McKEAN**

1. "At 4:30 PM I went to Rite Aid to get medicine then went home to let dogs out, start dryer. Then wife called me and said to get food for dinner. I drove back to Rite Aid to get meds and not done yet. So I went to Walmart and Dunkin Donuts for coffee. Then went back to Rite Aid and they said that meds was sent somewhere. They need to find out where. So I went to my office to work on contracts that have to be done tomorrow and I was waiting for Bob to email me prices. Then wife called me and said meet her at Joe's Pizza to have dinner as the stuff I bought will take too long to cook tonight. So I came home to put dogs back in house because it was raining and that is when I found fire and called 911. So I went in front door but couldn't get in because of black smoke so I went to garage back door of garage to get dogs – moved them then I went to back porch to try to get in but smoke was very heavy so went to kitchen door but smoke was so heavy there could not get in so I went to side window to grab what I could and grabbed hose to wet things down."

#### **G. DEPOSITION TRANSCRIPT OF STEPHEN McKEAN TAKEN OCTOBER 24, 2013**

1. When his son Roman arrived he was on the ground because he had fainted. The dogs were in the dog run. Page 15

2. He loved the house. It's his dream house. Page 16
3. The company owned more than it owed. Page 20
4. In the 28 years that he lived there he had 3 fires. Page 26
5. The mortgage was in foreclosure. Page 27
6. They use Bic lighters for lighting all of their candles. Page 28
7. There were two Rite Aids in the town of Milford. The prescription went to the other Rite Aid. Page 43
8. When the fire marshal told him that he suspected arson was after he had come back out of the ambulance. Page 45
9. He let the dogs out before he went to Walmart or Dunkin Donuts. Page 48
10. He went to the back porch and removed the dogs from the back porch. Page 50
11. "I called 911 first. Then I called my wife, or I believe she called me." Page 63
12. He doesn't know who he called first. Page 64
13. He was to meet his wife between 7:00 and 7:30. Page 68

#### **H. DEPOSITION TRANSCRIPT OF MICHELE McKEAN TAKEN OCTOBER 24, 2013**

1. She called her husband because he didn't show up. He was huffing and puffing and said the house is on fire. She went directly home. Page 7
2. She doesn't recall receiving a foreclosure notice. Page 12
3. They were behind on the mortgage. Page 12
4. Neither she nor her husband smoke. Page 26

#### **I. REPORT OF JOSEPH MYERS, CFI, CFEL, CFII, DATED APRIL 18, 2012**

1. "Investigator Jones did not find any evidence of malfunction or electrical activity on the fan/light. He was premature to eliminate the fan/light because it had not been thoroughly examined until a joint examination was conducted on December 10, 2012. (More than a year later)." Page 6

2. "Conclusion: Since there was no evidence of electrical activity on the house wiring or stranded wire of the fan/light, but there was evidence of electrical activity found later on the windings of the motor, suggest there was an electrical malfunction of the fan/light while it was on and there was current to the fan motor at the time of the fire and cannot be ruled out as a possible cause of the fire. One could not eliminate the fan as an ignition source without a thorough examination of the motor windings." Page 7
3. "If one looks at the chair in (Myers Photos 7-10) which were taken on the day of the joint scene examination, one can see the chair wing with burn patterns on the side facing the sofa. These patterns are clearly from 'radiant heat'. A close look at the seat also reveals the most intense burning is on the side toward the sofa. There is little or no damage on the opposite side. This investigator further opines the direction of travel is from the center couch. Had a separate fire originated on the seat cushion the damage would be equal across the surface of the seat." Page 7
4. "Examination of the couch furthest north reveals the wood framework closest to the center couch is totally consumed as compared to the opposite end. Again, the direction of fire travel being from the center couch." Page 7
5. "The following section of the Ignition Handbook by Vytenis Babrauskas, Ph.D. addresses the subject of radiant heat as it applies to 'Upholstered furniture and mattresses' Page 934 (Bottom of first column)...But it is not necessary for a room to reach flashover before significant flaming and high heat fluxes can be found in localized places. Thus upholstered furniture may well ignite from radiant heating occurring prior to flashover. In addition, NIST (National Institute of Standards and Technology) and CBUF (Combustion Behavior of Upholstered Furniture) testing indicate that, if one arm of an upholstered chair or sofa is flaming, the other arm commonly ignites from radiant heating not by surface flame spread." Page 7
6. "The ignition source for the one sofa and chair most likely come from one source; the sofa below the fan/light, and are the results of radiant heat and cannot be ruled out as such." Page 8
7. "There is a question of whether or not this object was in this area pre fire. If one looks closely at this photo he will see 'drag' marks or a thin trail from the direction of the entrance. In addition there is a 'brush' mark on the miter of the baseboard, which may have occurred when the object passed...It also appears to have been projected into the kitchen." Page 8
8. "Once this area was photographed this evidence should have been collected and preserved." Page 8
9. "On page 132, Stephen McKean states the windows to the right of the entrance broke out and then he saw flames. Obviously, there had to be pressure building up on the interior as the fire was starving for air (oxygen) from the smoldering fire. Once the window

failed, air was introduced into the fire compartment, causing a more rapid fire growth. This rapid fire growth causes the sudden expansion of air creating convection currents inside the fire compartment. This cannot be ruled out as a reason why Origin 4 and five appear to be separate points of origin.” Page 9

10. “The fan/light cannot be ruled out as a possible ignition source which caused the fire. In addition, the effects of radiant heat cannot be ruled out as the cause of fire spread to the other couch and chair in the living room. It is the opinion of this investigator, that the cause of this fire is ‘undetermined’.” Page 10

## ANALYSIS

Fire Chief Tony Mann requested Trooper Russel Andress because he had suspicions that the cause of the fire was incendiary. Mr. Andress drove to the scene of the fire and arrived at approximately 10:30 PM. He examined the scene during the darkness of night under flashlights or artificial light and concluded after approximately 40 minutes that there were five separate fire origins and that they were all started by a human being with an open flame. According to Mr. Andress, the five separate origins were the charred rag or towel lying on the hardwood floor, charred paper on the kitchen counter, a couch, a loveseat, and a recliner.

Mr. Andress misleads the readers of his report when he states, "The first area of damage occurred on the floor next to the interior wall which separates the kitchen from the living room. This officer observed a charred rag or towel lying on the hardwood floor." This is incorrect. There is no interior wall to separate the kitchen from the living room. The kitchen, living room, and dining room on the first floor are all one open space with stairways ascending to the second floor. All of the five separate origins that he identifies are within this open space where there is nothing to inhibit flying brands, heat, hot gases, and drop down burning debris from migrating through the space. **See Figures 1 - 2**

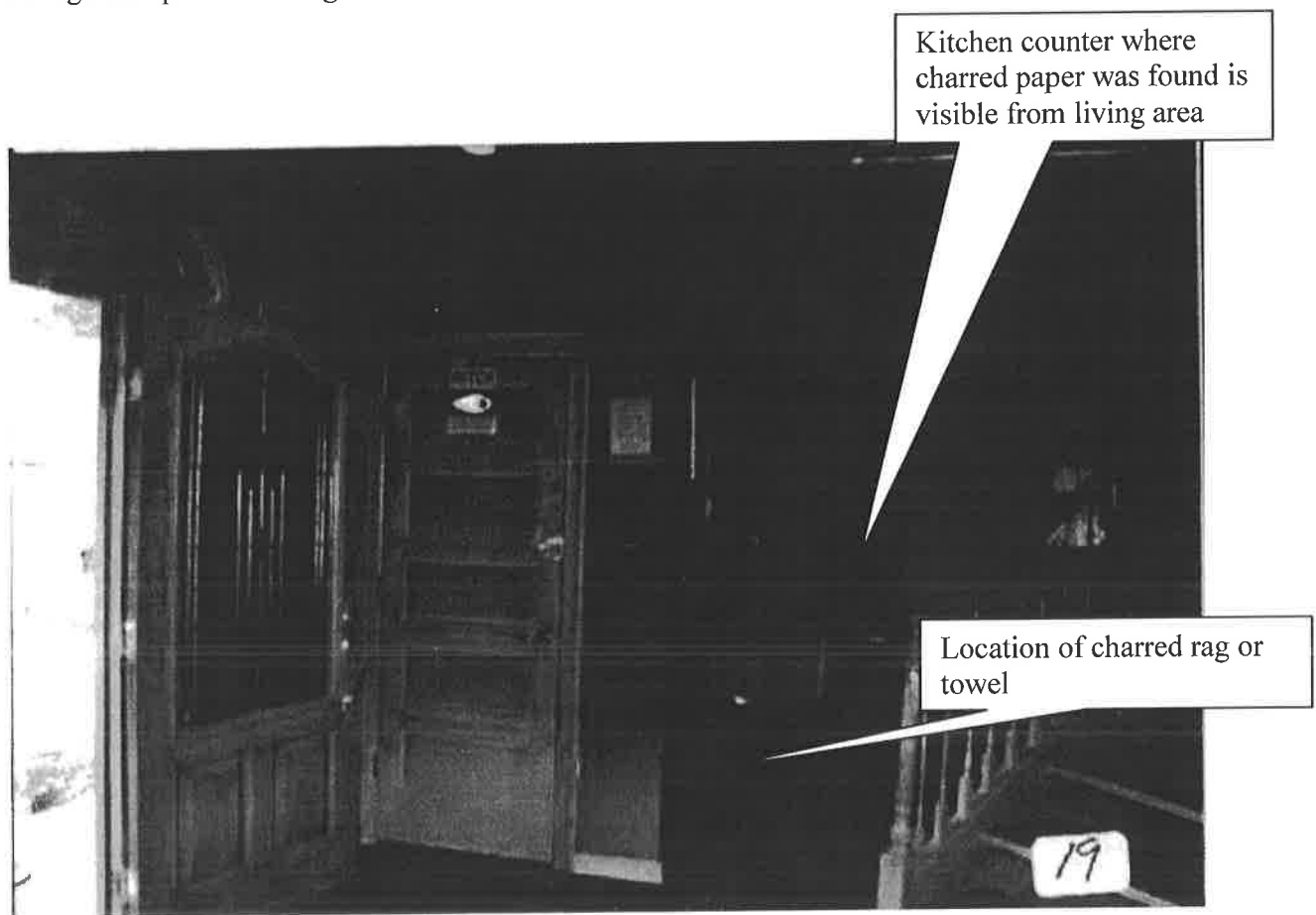
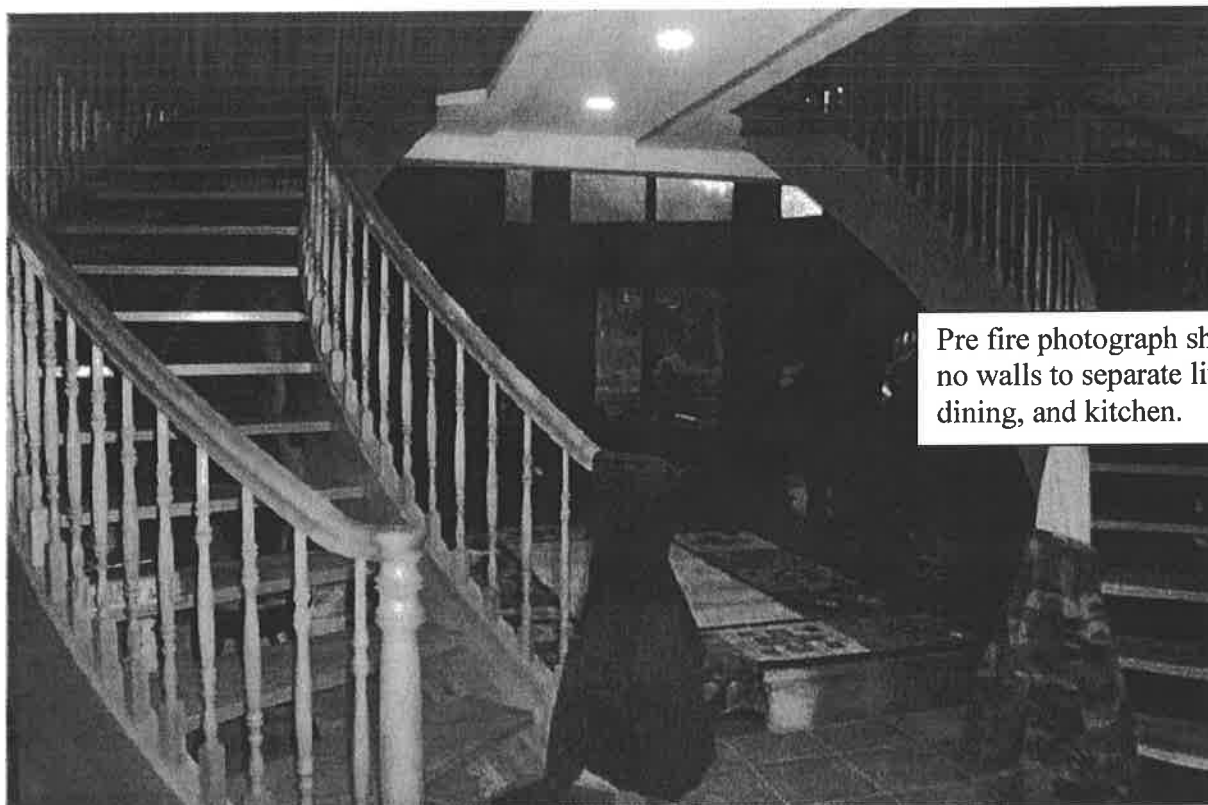


Figure 1



**Figure 2**

The wall above where the charred rag or towel was found has marks that ascend as you move from left toward the right and toward the outside window at the front of the kitchen area. See **Figures 3 - 5**



**Figure 3**

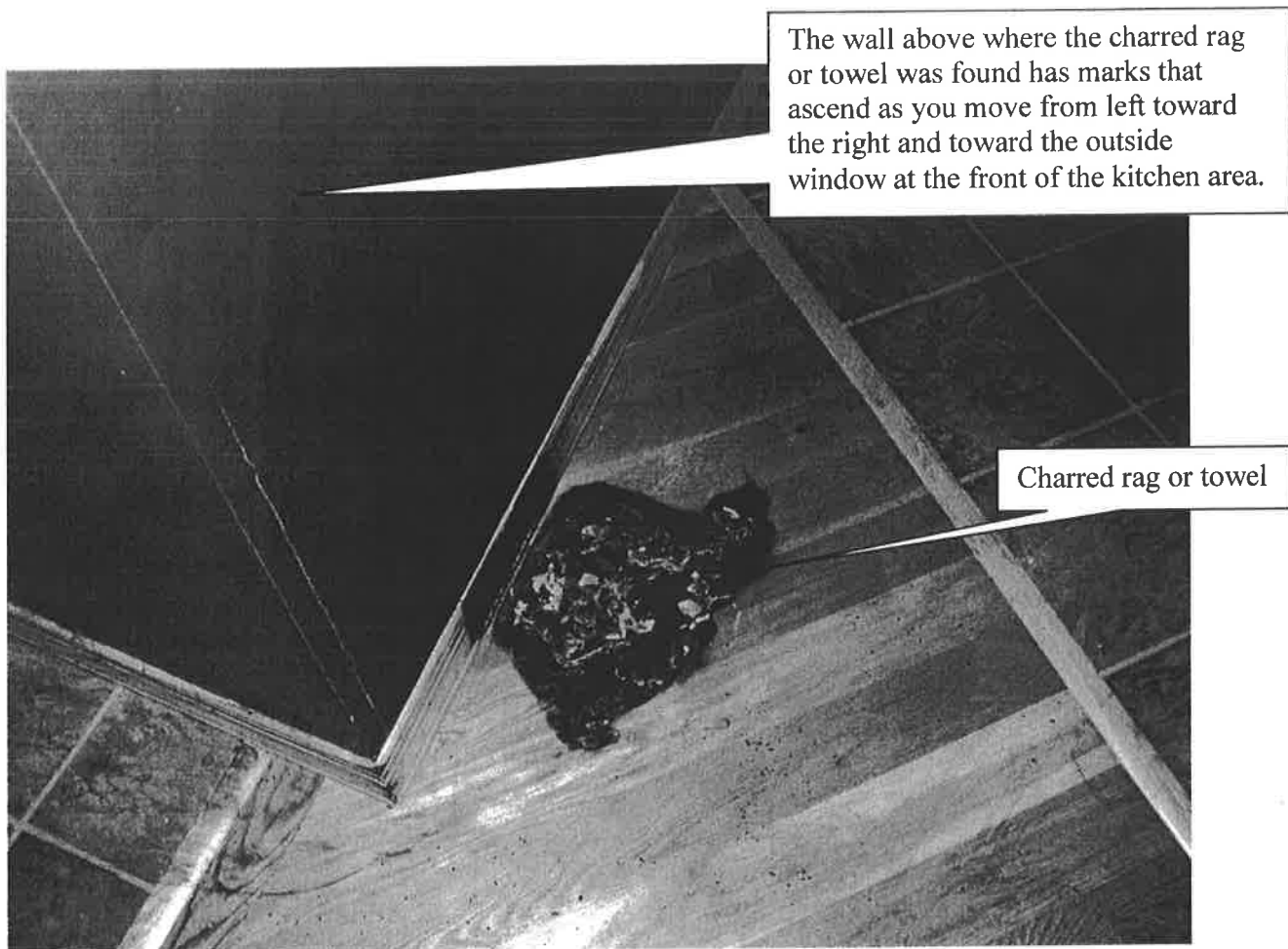


Figure 4



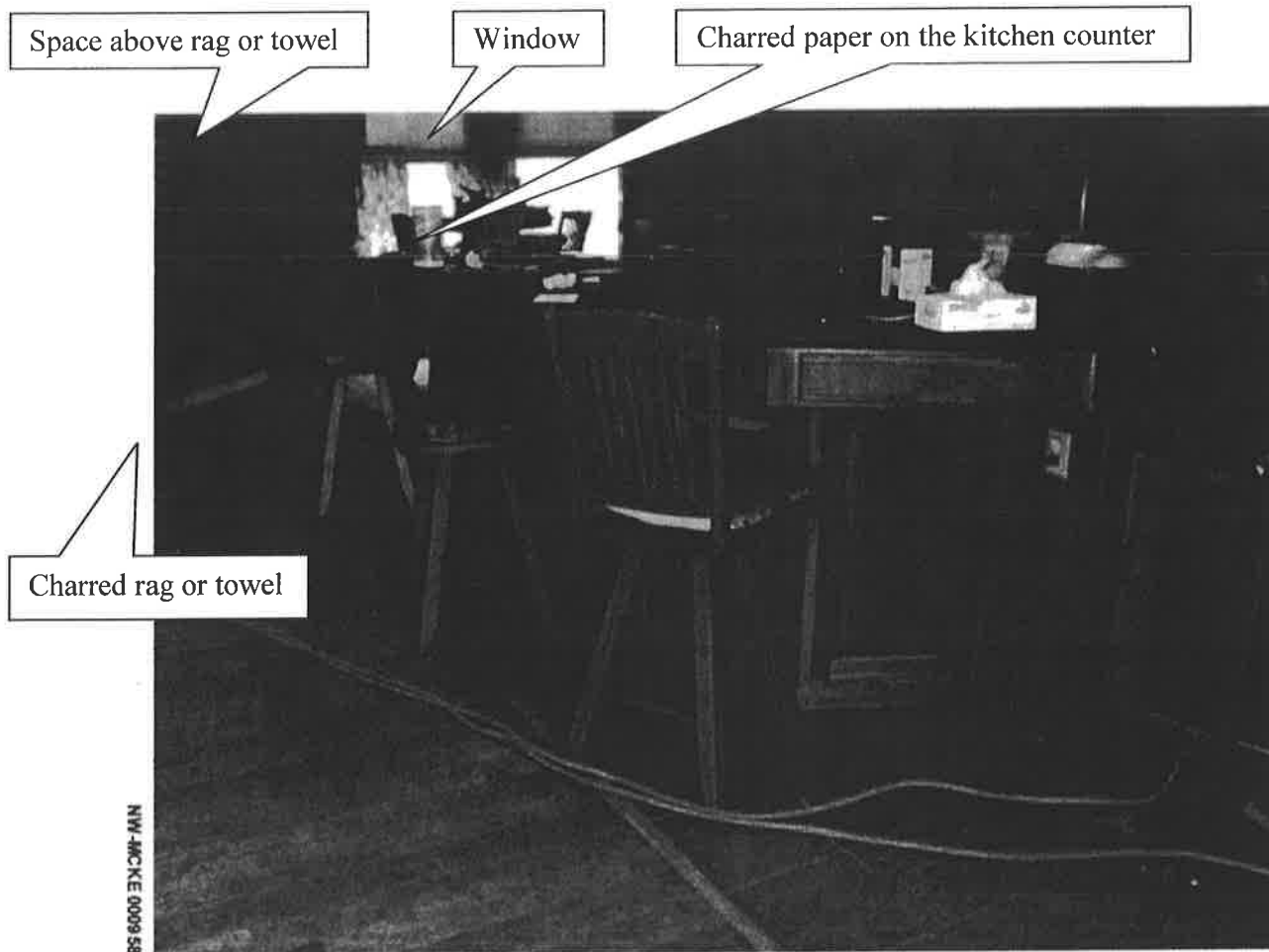
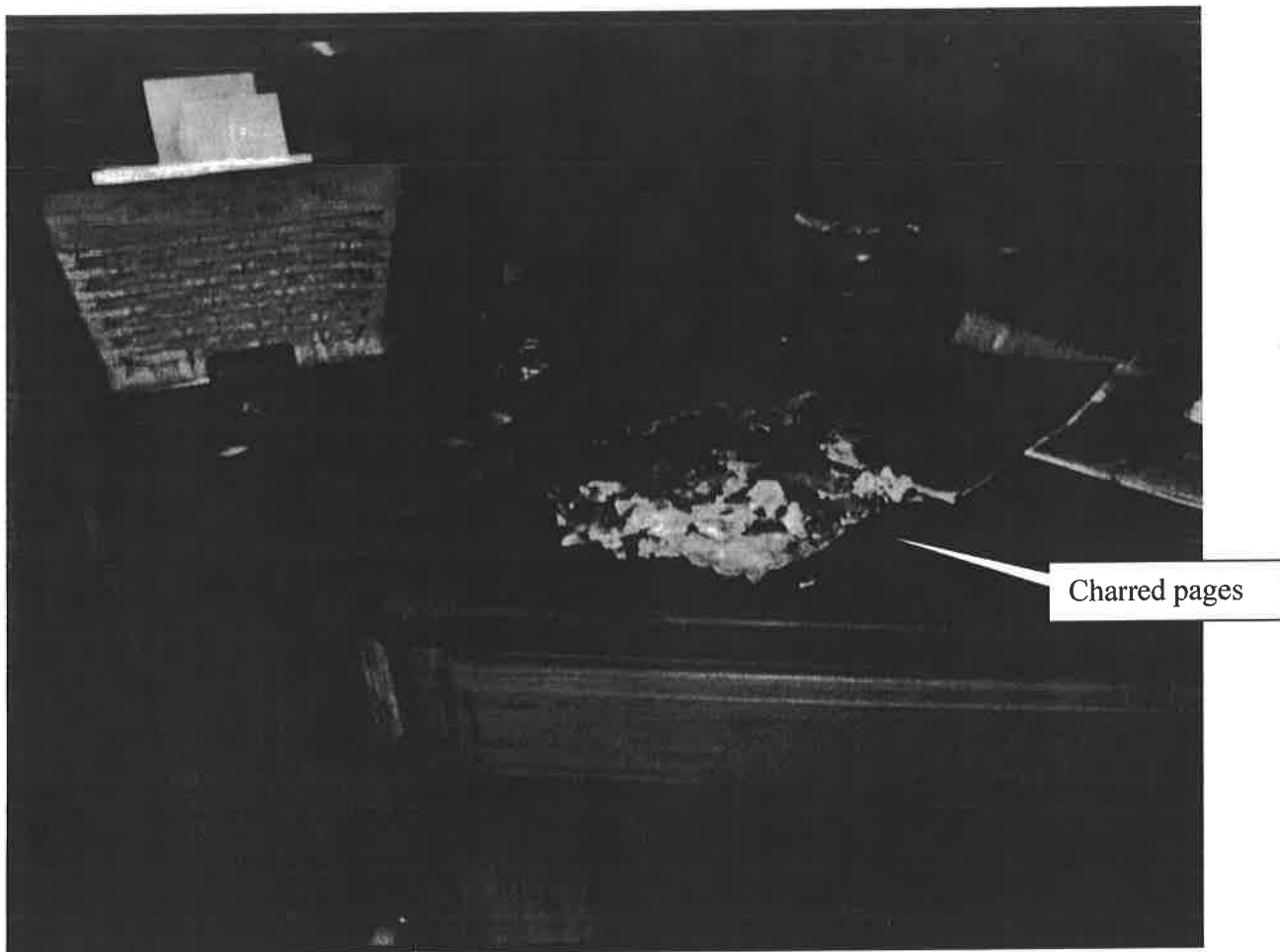


Figure 5

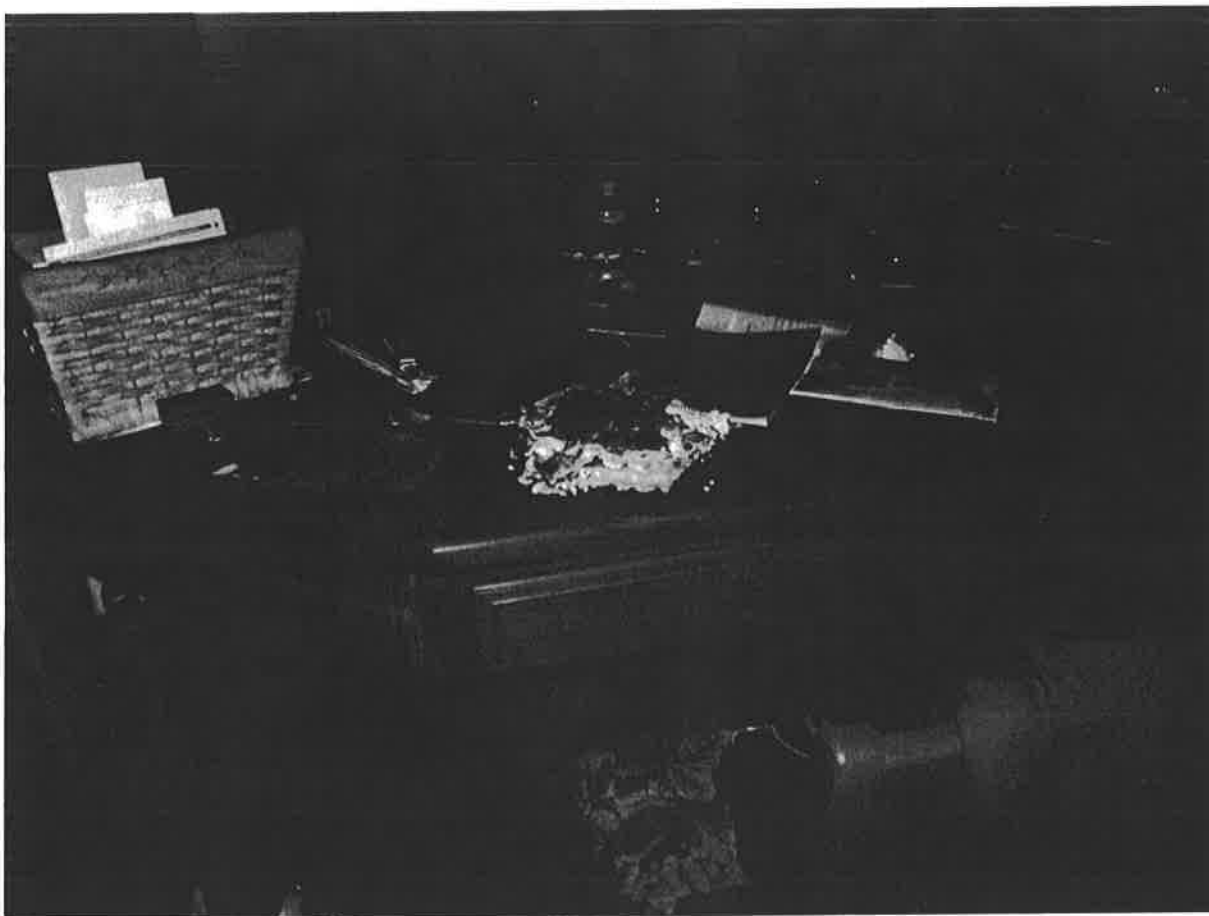
The charred papers are shown near the edge of the counter in the kitchen. See Figures 6 – 8



**Figure 6**



**Figure 7**



**Figure 8**

The couch, love seat, and recliner were all arranged around the living area where the ceiling fan/light was located. See Figures 9 - 11

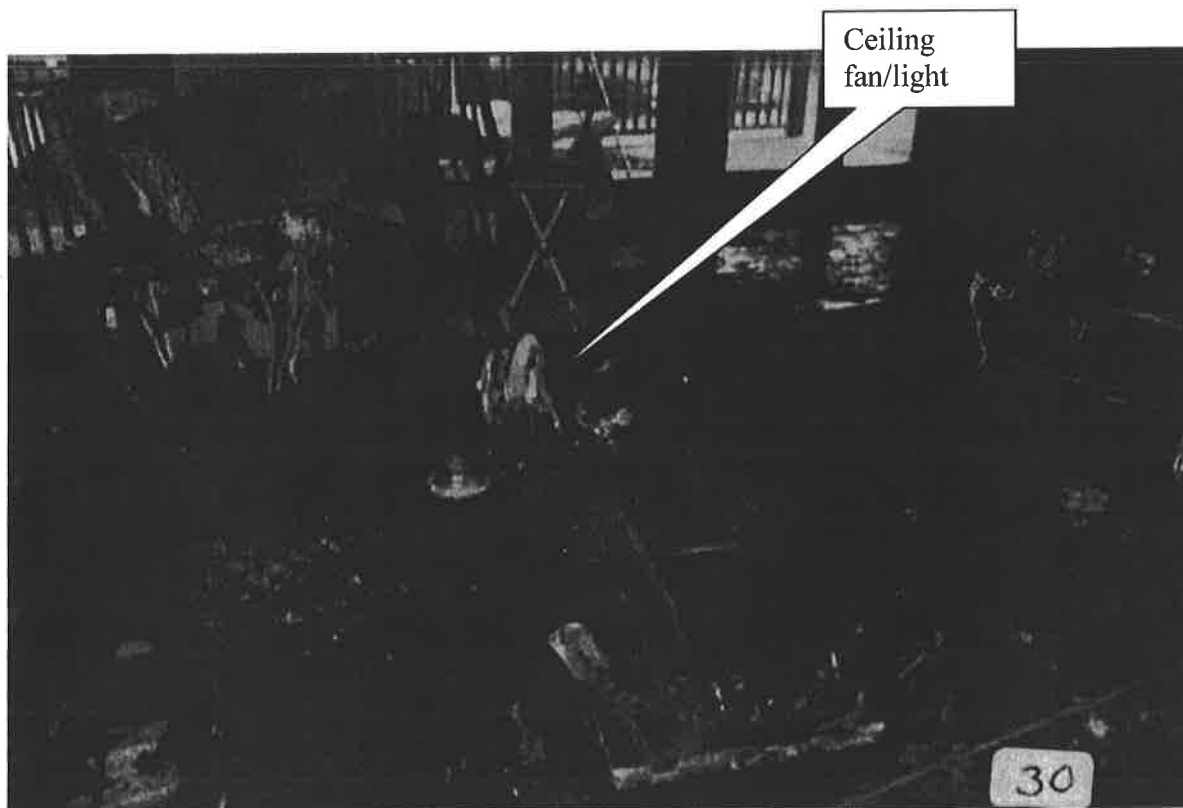
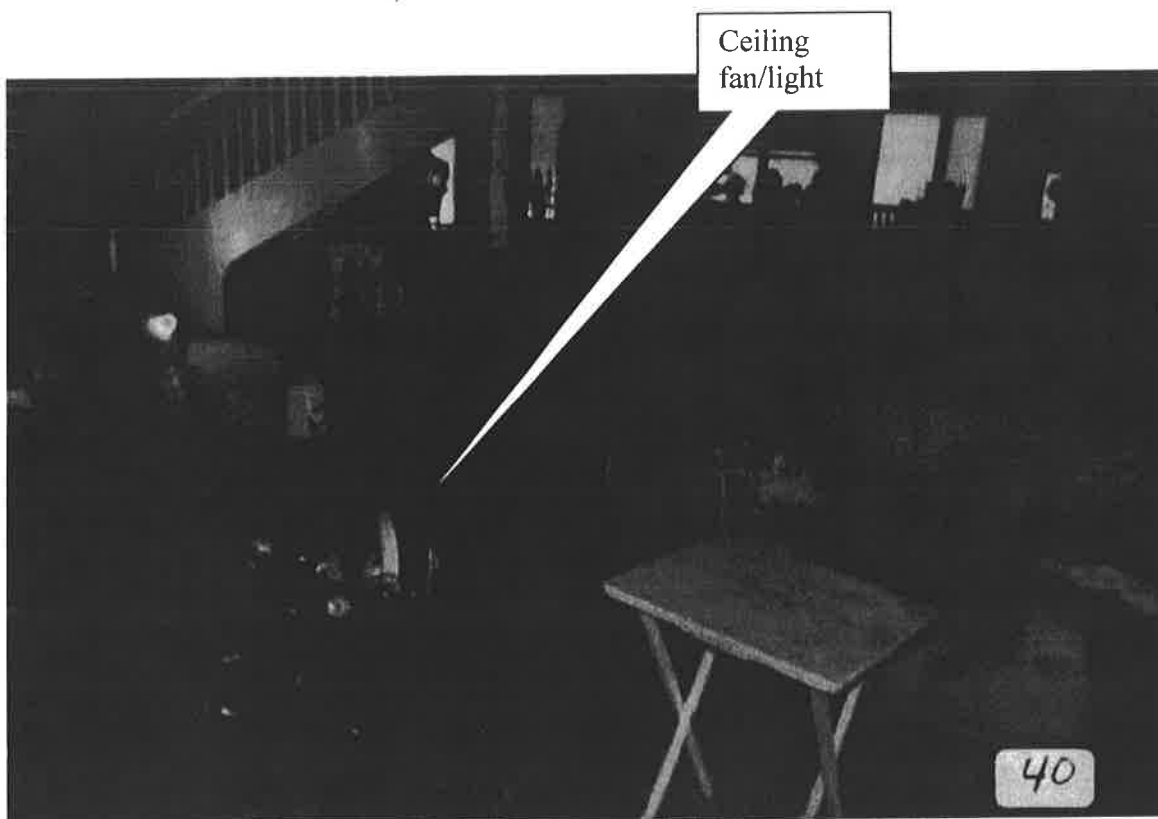


Figure 9



**Figure 10**



**Figure 11**

There were no walls or partitions separating the five origins that Mr. Andress identified. The heavily burned furniture caused hot gases to rise and circulate through the compartment that included the kitchen, living, and dining areas. The markings on the wall above the burned rag or towel show that movement was occurring from the area of the burning living room furniture toward the kitchen area. Burning debris would be expected to be carried from the burning furniture and drop down onto other things including other furniture, wall hangings, and loose papers. The locations where burning debris falls can result in them igniting remote fuels which can appear to be different origins.

The potential for ignition of additional fuels within the same compartment are well known in the engineering and scientific communities. As outlined in my February 5, 2013 report, the National Fire Protection Association (NFPA) 921 Guide for Fire and Explosion Investigations 2011 Edition states:

**22.2.1.2** Separate fires that are not caused by multiple deliberate ignitions can result from the following:

- (1) Fire spread by conduction, convection, or radiation
- (2) Fire spread by flying brands

- (3) Fire spread by direct flame impingement
- (4) Fire spread by falling flaming materials (i.e., drop down) such as curtains
- (5) Fire spread through shafts, such as pipe chases or air conditioning ducts
- (6) Fire spread within wall or floor cavities within "balloon construction"
- (7) Overloaded electrical wiring
- (8) Utility system failures
- (9) Lightning

The theory concluding that there are multiple origins within the open space of the living, kitchen, and dining areas is contradictory to NFPA 921. The presence of the burned paper on the kitchen counter, the charred rag or towel, and the nearby furniture are all consistent with being outgrowth of a fire that originated at a single location in the living area.

Mr. Andress stated, "What we see happening in this fire, given the construction of this structure, a vaulted ceiling in the center of the structure, as these individual items are burning, all those super-heated gases and unburned fuels are rising into the ceiling layer, which is covered in drywall, and traveling to the upper reaches of the structure. We have no open windows. We have no ventilation sources until this fire self-ventilates through a front window adjacent to the living room. We have very little, if any, fire movement from each of these fires." This paragraph contains contradictory statements. First he states that there are fuels that are rising into the ceiling layer and that it ventilates through the front window but then states that there is little if any fire movement. The markings on the wall show that there were forces present that could carry burning debris and drop down to remote locations.

Mr. Andress collected a Bic lighter that he found at the fire. Mr. McKean testified that they used the Bic lighter for lighting candles. Mr. Andress did not collect the charred rag or towel. If this rag or towel was considered significant it should have been collected for future analysis that may have determined where it came from.

The ignition of the remote locations at the McKean residence is consistent with NFPA 921.

**"3.3.45 Drop Down.** The spread of fire by the dropping or falling of burning materials. Synonymous with "fall down."

**3.3.181 Ventilation-Controlled Fire.** A fire in which the heat release rate or growth is controlled by the amount of air available to the fire.

#### **5.9\* Fire Spread in a Compartment.**

**5.9.1** The heat release rate of a fire is generally a function of the amount and type of fuel that is involved at any given time and the ventilation conditions. An increase in the heat release rate can occur through flame spread on an individual fuel package, through the ignition of additional



fuels, or by changes in ventilation. As the fire grows in size, it increases the potential for fire spread to other compartments or areas within the building. Flame spread is the movement of flames on an individual fuel package (e.g., sofa or combustible wall), and fire spread is described as the ignition of additional fuel packages that can spread the fire throughout a compartment or building.

**5.9.2 Fire Spread.** Fire spread, as opposed to flame spread, involves the ignition of more remote fuel packages. The fuel packages can be located within the same or in adjacent compartments. The fire can spread either by direct flame impingement or by remote ignition of adjacent fuel packages.

**5.9.2.2.2** Fire spread can also occur as a result of “drop down.” This occurs when a flaming material drops down and ignites combustibles that it falls on or near. When a flame is burning on an elevated structure or material within a compartment, the possibility exists that before the fuel is completely consumed, the elements will lose integrity and cause the fuel to fall to other areas within the compartment or to a lower level or floor of a building. If this occurs, the still-burning fuel could be next to combustible material that has yet to ignite. Drop down also occurs with burning thermoplastic materials, curtains, draperies, or other thin fuel items.

**6.3.3.2.10 Drop Down (Fall Down).** Burning debris can fall and burn upward, creating a new pattern from this heat source. This occurrence is known as *drop down*. Drop down can ignite other combustible materials, producing low burn patterns.

Mr. Andress made the determination that there were five separate incendiary fires within 40 minutes of when he arrived at the poorly illuminated fire scene. He didn't perform a thorough inspection of the ceiling light/fan. Drawing a conclusion about the cause should only be done after a thorough investigation has been completed. Mr. Andress did not perform a thorough investigation and as a result reached conclusions about the fire without ruling out other possibilities that are also consistent with what the evidence shows.

**22.2.8.2** The investigator is strongly cautioned against using subjective opinions to support an incendiary cause determination in the absence of physical evidence.

**22.4.1.1** These evidentiary factors regarding the identification of a suspected firesetter, or the “motive” or opportunity for the fire, cannot be substituted for a properly conducted investigation and determination of the fire's origin and cause.

**22.4.1.2** In the absence of physical evidence of an incendiary fire, the investigator is strongly cautioned against using the discovery or presence of these other evidentiary factors in developing a hypothesis, forming opinions, or drawing conclusions concerning the cause of the fire.

In my February 5, 2013 report I provided my basis for determining that the ceiling fan/light that had been located above the living area furniture could not be ruled out as a cause. My report was written after a thorough examination of the ceiling light/fan. The additional information that I have reviewed does not include anything that is a reason for changing my conclusions in that report.

## **J. FINDINGS**

Within the bounds of reasonable engineering certainty, and subject to change if additional information becomes available, it is my professional opinion that:

1. The ceiling fan/light above the living room could not be ruled out as a cause of the fire.
2. The cause of this fire is undetermined.



Daryl Ebersole, P.E., CFEI